tics have become so well determined and so familiar that if title pages were removed and all reference to the authors deleted, no astronomer could be left in doubt as to the source from which they came.

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The Chemistry of Food and Nutrition. By Henry C. Sherman. Second edition. New York, The Macmillian Co. 1918.

This well-known text-book has been rewritten and presents modern knowledge upon the subject of nutrition in an exceptionally clear and readable form. The chemistry of foods is described, then the digestion and metabolism of the different food-stuffs. The review of the subject of the "vitamines" and of "growth hormones" is excellently handled and nowhere have these "accessory factors" in nutrition been more clearly defined. Sherman's long experimental studies of the salt metabolism and especially the calcium metabolism give authority to his discussion of the inorganic food-stuffs. The chapter on the dietary standards and economic use of food is of an order of excellence which has never been surpassed. Sherman's experience, based upon his own painstaking researches into the dietary habits of the poor classes of New York City, conducted for the New York Association for Improving the Condition of the Poor, leads him to declare that "the most frequent deficiency in American dietaries is inadequacy of the total food or energy value and most dietaries actually observed are of such composition as would furnish enough of each essential element if the total amount of food eaten were sufficient to provide a liberal energy supply."

Sherman clearly sets forth the principles of a sufficient and economical dietary in such a manner as to bring to mind the really great progress in the science of dietetics which has taken place in the last decade. This excellent and thoroughly scientific treatise upon nutrition should be in the hands of all who are interested in the food question, both as it appears now and as it will shape itself after the war. It is a pleasure to note that the author has been unusually conscientious and generous in giving credit to the work of others.

Graham Lusk

SPECIAL ARTICLES

THE FORMATION OF THE FAT DROPLETS IN THE CELLS OF TISSUE CULTURES

Experiments of Daddi (1896)[1] and more particularly those of Riddle (1910)[2] show that Sudan III., fed to animals, is taken up by fat in the intestine, passes through the intestinal wall in combination with fat, and is deposited in the body cells in the form of red fat globules. These observations suggested a method for testing out the question as to whether or not the mitochondria form the fat droplets. If Sudan III. remains attached to the fat, as Riddle seems convinced it does, and the cells store up this Sudan III. fat, the question arises, is the Sudan III. fat deposited in the mitochrondria before appearing as red fat globules in the cytoplasm? If such were the case, we should be able to find traces of the Sudan III. in the mitochondrium, at least during the final stages in the formation of the fat droplet, but this could not be done, and as will be seen below, the mitochondria take no part in the formation of the fat droplet under such conditions.

The yolk of a hen egg was mixed with Sudan III. until it became red. A small quantity of this red yolk was then diluted with Locke-Lewis solution and placed on a number of twenty-four-hour cultures of 6–9-day chick embryos (Lewis and Lewis method). Certain of the cells were then selected and their unstained fat droplets noted and drawn. Each of these cells was carefully followed for the next few hours, or until a number of fat droplets had appeared in the cytoplasm. These took the form of exceedingly small, reddish-yellow droplets, often far removed from any

[1] Daddi, L., "Nouvelle méthode pour colorer la graisse dans les tissues," *Arch. Ital. de Biol.*, 26, 1896.

[2] Riddle, O., "Studies with Sudan III. in Metabolism and Inheritance," *Jour. Exper. Zool.*, 8, 1910.